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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,347	12/03/2003	Richard C. Chu	POU920030167US1	9034

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EXAMINER	
HOFFBERG, ROBERT JOSEPH	

ART UNIT	PAPER NUMBER
2835	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/726,347	CHU ET AL.	
	Examiner	Art Unit	
	Robert J. Hoffberg	2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/3/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Detailed Action

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., In re Berg, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In re Thorington, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1-3, 5-8, 16, 18-21 and 28-30 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-2, 5-9, 13-1, 17-20, 24-26 and 27-29 of copending Application No. 10/726,377. Although the conflicting claims are not identical, they are not patently distinct from each other.

Regarding Claims 1, 16 and 28, claims 1, 16 and 28 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 13 and 24 of copending Application No. 10/726,377. These claims in both applications provide the same structure of a heat exchanger, a first cooling loop with a control valve and a chilled water source and a second cooling loop providing coolant to electronic subsystems.

Regarding Claim 2, claim 2 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 5 of copending Application No. 10/726,377. These claims in both applications provide the same structure of a common source of chilled facility coolant.

Regarding Claims 3 and 18, claims 3 and 18 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 6, 17 and 27 of copending Application No. 10/726,377. These claims in both applications provide the same structure of two sets of input and return lines.

Regarding Claim 5, claim 5 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 7, 18 and 28 of copending Application No. 10/726,377. These claims in both applications provide the same structure of multiple electronic racks being cooled by cooling units.

Regarding Claims 6, 19 and 29, claims 6, 19 and 29 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 2, 14 and 25 of copending Application No. 10/726,377. These claims in both applications provide the same structure of redundant cooling units.

Regarding Claims 7, 20 and 30, claims 7, 20 and 30 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 8, 19 and 29 of copending Application No. 10/726,377. These claims in both applications provide the same structure of a controller for automatically switching to a redundant cooling unit.

Regarding Claims 8 and 21, claims 8 and 21 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 9 and 20 of copending Application No. 10/726,377. These claims in both applications provide the same structure of a shut-off valve.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2, 4-8, 10-11, 16-17, 19-21, 23-24, 28-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Takahashi et al. (US 6,182,742).

With respect to Claim 1, Takahashi et al. teaches a cooling system comprising: multiple coolant conditioning units (CCUs) (Fig. 1, #1100A and #1100B), each CCU at least some coolant conditioning units of the multiple CCUs providing system coolant to a different, associated electronics subsystem (Fig. 1, #100) of multiple electronics subsystems (Col. 2, lines 34-35) to be cooled; and wherein each CCU of the at least some CCUs comprises a heat exchanger (Fig. 1, #1120A and #1120B), a first cooling loop (left side of Fig. 1, #1120A and #1120B) with a control valve (Fig. 1, #1180A and #1180B), and a second cooling loop (right side of Fig. 1, #1120A and #1120B), the first cooling loop receiving chilled facility coolant (Col. 3, lines 19-20) from a source and passing at least a portion thereof via the control valve through the heat exchanger, the second cooling loop providing cooled system coolant (Col. 3, line 21) to the associated electronics subsystem, and expelling heat in the heat exchanger from the associated electronics subsystem to the chilled facility coolant in the first cooling loop, wherein the control valve allows regulation of facility coolant flow through the heat exchanger, thereby allowing independent control of a desired temperature of the system coolant in the second cooling loop for cooling the associated electronics subsystem.

With respect to Claim 2, Takahashi et al. further teaches wherein the source of chilled facility coolant comprises a common source (Fig. 1, arrows on left side) coolant supplied to the at least some CCUs.

With respect to Claim 4, Takahashi et al. further teaches wherein the multiple CCUs comprise multiple dedicated CCUs, wherein each dedicated CCUs is associated with a different electronics subsystem to be cooled (Col. 2, lines 34-35).

With respect to Claim 5, Takahashi et al. further teaches wherein the multiple electronics subsystems comprise multiple electronics racks (Col. 2, line 33 computer), each electronics rack being cooled by an associated, dedicated CCU of the multiple CCUs.

With respect to Claim 6, Takahashi et al. further teaches wherein the multiple CCUs comprise multiple CCU pairs, each CCU pair comprising a dedicated CCU (Fig. 1, #1100A) and a redundant dedicated CCU (Fig. 1, #1100B) for cooling a different, associated electronics subsystem (Col. 2, lines 34-36) of the multiple electronics subsystems.

With respect to Claim 7, Takahashi et al. further teaches a controller (Fig. 1, #2000) for monitoring operation of the CCU pairs and upon detection of a failure (Col. 3, lines 58-64) in a dedicated CCU for automatically switching to the redundant dedicated CCU of the CCU pair having the failure to ensure continued cooling of the associated electronics subsystem.

With respect to Claim 8, Takahashi et al. further teaches shutoff valves (Fig. 1, #1170A and #1170B) coupled to the dedicated CCU and the redundant dedicated CCU

of each CCU pair of the multiple CCU pairs for selectively directing chilled facility coolant flow through one of the CCUs of the CCU pair.

With respect to Claim 10, Takahashi et al. further teaches a controller (Fig. 1, #2000) and a redundant controller (Col. 4, line 12) for monitoring operation of the CCU pairs, the redundant controller functioning (Col. 4, lines 12-13) in place of the controller upon detection of a failure in the controller.

With respect to Claim 11, Takahashi et al. further teaches wherein each CCU of the at least some CCUs further includes a reservoir (Fig. 1, #1400) in series with the second cooling loop for ensuring an adequate supply of system coolant flow through the second cooling loop.

With respect to Claim 16, Takahashi et al. teaches a cooled electronics system comprising: multiple electronics subsystems (Fig. 1, #100 and Col. 2, lines 34-35); multiple coolant conditioning units CCUs (Fig. 1, #1100A and #1100B), each CCU of the multiple CCUs providing system coolant to a different, associated electronics subsystem of the multiple electronics subsystems; and wherein each CCU of the multiple CCUs comprises a heat exchanger (Fig. 1, #1120A and #1120B), a first cooling loop (left side of Fig. 1, #1120A and #1120B) with a control valve (Fig. 1, #1180A and #1180B), and a second cooling loop (right side of Fig. 1, #1120A and #1120B), the first cooling loop receiving chilled facility coolant (Col. 3, lines 19-20) from a source and passing at least a portion thereof via the control valve through the heat exchanger, the second cooling loop providing cooled system coolant (Col. 3, line 21) to the associated electronics subsystem, and expelling heat in the heat exchanger from the associated electronics

subsystem to the chilled facility coolant in the first cooling loop, wherein the control valve allows regulation of facility coolant flow through the heat exchanger, thereby allowing independent control (Fig. 1, #2000) of temperature of the system coolant in the second cooling loop for cooling the associated electronics subsystem.

With respect to Claim 17, Takahashi et al. further teaches wherein the multiple electronics subsystems comprise multiple electronics racks (Col. 2, line 33 computer).

With respect to Claim 19, Takahashi et al. further teaches wherein the multiple CCUs comprise multiple CCU pairs, each CCU pair comprising a dedicated CCU (Fig. 1, #1100A) and a redundant dedicated CCU (Fig. 1, #1100B) for cooling a different, associated electronics subsystem of the multiple electronics subsystems.

With respect to Claim 20, Takahashi et al. further teaches a controller (Fig. 1, #2000) for monitoring operation of the CCU pairs and upon detection of a failure (Col. 3, lines 58-64) in a dedicated CCU for automatically switching to the redundant dedicated CCU for the CCU pair having the failure to ensure continued cooling of the associated electronics subsystem.

With respect to Claim 21, Takahashi et al. further teaches shutoff valves (Fig. 1, #1170A and #1170B) coupled to the dedicated CCU and the redundant CCU of each CCU pair of the multiple CCU pairs for selectively directing chilled facility coolant through one of the CCUs of the CCU pair.

With respect to Claim 23, Takahashi et al. further teaches a redundant controller (Col. 4, line 12) for monitoring operation of the CCU pairs, the redundant controller

functioning (Col. 4, lines 12-13) in place of the controller upon detection of a failure in the controller.

With respect to Claim 24, Takahashi et al. further teaches wherein each CCU of at least some CCUs of the multiple CCUs further includes a reservoir (Fig. 1, #1400) in series with the second cooling loop for ensuring adequate system coolant flow through the second cooling loop.

With respect to Claim 28, Takahashi et al. teaches a method for cooling multiple electronics subsystems (Fig. 1, #100 and Col. 2, lines 34-35), the method comprising: providing multiple coolant conditioning units (CCUs) (Fig. 1, #1100A and #1100B), each CCU of at least some CCUs of the multiple CCUs providing system coolant to a different, associated electronics subsystem of the multiple electronics subsystems to be cooled, wherein each CCU of the at least some CCUs comprises a heat exchanger (Fig. 1, #1120A and #1120B), a first cooling loop (left side of Fig. 1, #1120A and #1120B) with a control valve (Fig. 1, #1180A and #1180B), and a second cooling loop (right side of Fig. 1, #1120A and #1120B) with system coolant (Col. 3, line 21); providing, for each CCU of the at least some CCUs, chilled facility coolant (Col. 3, lines 19-20) to the first cooling loop from a source and passing at least a portion thereof via the control valve through the heat exchanger; providing, for each CCU of the at least some CCUs, cooled system coolant within the second cooling loop to the associated electronics subsystem, and expelling heat in the heat exchanger from the associated electronics subsystem to the chilled facility coolant in the first cooling loop; and wherein the control valve of the CCU allows regulation of facility coolant flow through the heat exchanger, thereby

allowing independent control (Fig. 1, #2000) of a desired temperature of the system coolant in the second cooling loop for cooling the associated electronics subsystem.

With respect to Claim 29, Takahashi et al. further teaches wherein the providing of multiple CCUs comprises providing multiple CCU pairs, each CCU pair comprising a dedicated CCU (Fig. 1, #1100A) and a redundant dedicated CCU (Fig. 1, #1100B) for cooling a different, associated electronics subsystem of the multiple electronics subsystems.

With respect to Claim 30, Takahashi et al. further teaches monitoring operation of the CCU pairs and upon detection of a failure (Col. 3, lines 58-64) at a dedicated CCU, automatically switching to the redundant dedicated CCU of the CCU pair having the failure to ensure continued cooling of the associated electronics subsystem.

With respect to Claim 31, Takahashi et al. further teaches monitoring operation of the CCU pairs and upon detection of a failure at a dedicated CCU, automatically switching to the redundant dedicated CCU of the CCU pair having the failure (Col. 3, lines 58-64) to ensure continued cooling of the associated electronics subsystem.

With respect to Claim 32, Takahashi et al. further teaches providing redundant controllers (Col. 4, line 12) for monitoring operation of the CCU pairs, and automatically switching control to a redundant controller (Col. 4, lines 12-13) upon detection of a failure in one controller.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 3, 9, 18 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. (US 6,182,742).

With respect to Claims 3, 9, 18 and 22, Takahashi et al. teaches the cooling system, the cooled electronics system or the method of the above claims. While Takahashi et al. does not teach ~~does not teach~~ the redundant facility coolant supply lines and redundant facility coolant return lines independently servicing multiple CCUs, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to duplicate the chilled facility coolant source input and return lines with associated control means to automatically switch between coolant sources to insure redundancy in case of a failure of one of the chilled facility coolant sources and its lines. *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960).

7. Claims 12-15 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. (US 6,182,742) as applied to the above claims, in view of Nakagawa et al. (US 2003/0081380).

With respect to Claims 12, 13, 15, 25 and 27, Takahashi et al. teaches the cooling system or cooled electronic system of claims 1 or 16. Takahashi et al. does not teach the external system coolant reservoir with upward extending supply line. Nakagawa et al. further teaches wherein a shared external system coolant reservoir (Figs. 10 and 11) ensuring sufficient system coolant to the second cooling loop of each

CCU of the at least some CCUs as needed (Para. 0051). While Takahashi et al. in view of Nakagawa et al. does not teach the external system coolant reservoir shared by at least two CCUs of the at least some CCUs for ensuring sufficient system coolant flow through the second cooling loop of each CCU of the at least two CCUs, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the cooling system of Takahashi et al. with that of Nakagawa et al. for the purpose of having a reserve tank for replenishing liquid into the cooling system. Furthermore, it would be obvious to one of ordinary skill in the art at the time of the invention was made to provide to provide multiple lines from the reserve tank to a plurality of CCUs. It has been held that a mere duplication of parts has no patentable significance and would be obvious to one ordinary skill in the art at the time of the invention. *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960). Nakagawa et al. further teaches wherein each second cooling loop of the at least two CCUs is coupled to the common supply line via an upwardly extending branch line (see Fig. 11 and Para. 0050 line 5, reservoir in upper left corner is above CCU) which continues to hold system coolant notwithstanding removal of system coolant from the common supply line. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the cooling system of Takahashi et al. with that of Nakagawa et al. for the purpose placing the external reservoir above the CCUs to preventing draining of fluid in the CCUs into the external reservoir.

With respect to Claim 14 and 26, Takahashi et al. teaches the cooling system or cooled electronics system of the above claims. While Takahashi et al. does not teach

does not teach the redundant facility coolant supply lines and wherein a fluid communication path failure in one supply line or one second cooling loop only affects the CCU having the failing supply line or failing second cooling loop, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to duplicate the chilled facility coolant source input lines wherein a failure would affect only an individual CCU and not the entire system to insure redundancy in case of a failure of an individual chilled facility coolant source or its supply lines. *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kawashima et al. (US 4,865,123) teaches a plurality of CCUs in an electronic system. Hare et al. (US 6,035,655) and Stahl et al. teach redundant cooling systems. Stefani (US 5,226,471) teaches a bypassing to isolate a leaking CCU. Mizuno et al. teaches a controller to control the operation of the CCUs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert J. Hoffberg whose telephone number is (571) 272-2761. The examiner can normally be reached on 8:30 AM - 4:30 PM Mon - Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn D. Feild can be reached on (571) 272-2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RJH

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